10

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OPACITY

In 1978, as I was conducting my annual tour through the delights of "Quantifiers and Propositional Attitudes"[1] (Q&PA), I paused at a familiar transition point. It struck me, for the first time, as puzzling. What, exactly, was the argument that lay behind the transition? My investigation led me to a surprising discovery. But first, the puzzling transition.

Q&PA begins with a lesson on symbolization for the student of first order logic. Although my desire for a certain sloop is suitably expressed as:

(2) $(\exists x)(x$ is a sloop . I want $x)$

"If what I seek is mere relief from slooplessness, then (2) conveys the wrong idea." (The same lesson, though less sharply put, was offered earlier by Buridan, who noticed the difference between owing someone a particular horse and owing mere relief from horselessness.[2]) Thus, the vernacular sentence:

I want a sloop

is ambiguous between what Quine calls its *relational* reading, expressed by (2), and its likelier *notional* reading involving mere relief from slooplessness. Can we represent the ambiguity of this sentence as a mere grammatical reparsing within elementary logic? It appears so, says Quine, "with some premeditated violence to both logic and grammar."[3] The method is this: rewrite the verb as a 'propositional attitude', a form in which it becomes an operator taking, at least in part, a sentential complement. Thus *wanting* (a sloop) becomes *wishing that* one has (a sloop) in which "wishes that" takes a sentential complement.[4] The relational reading of the reformed vernacular sentence is then symbolized as a reformed version of (2):

An analytical Table of Contents for this essay can be found on page 288.
For comments, some valuable, some invaluable, I wish to thank Rogers Albritton, Joseph Almog, Tony Anderson, Paul Benacerraf, Dagfinn Føllesdal, Karel Lambert, Ruth Marcus, Nathan Salmon, and Richmond Thomason, all of whom read one draft or another of the paper; the Stanford Gang, who heard it; and W. V. Quine who did neither. I also wish to thank the National Science Foundation for patient support. Special thanks to Joseph Almog who told me what my other friends wouldn't.

(3) $(\exists x)(x$ is a sloop . I wish that: I have $x)$

and the notional sense of the reformed vernacular sentence is symbolized as:

(4) I wish that: $(\exists x)(x$ is a sloop . I have $x)$

(The colon is used syntactically, and only temporarily, to demarcate the complement to the operator.)[5]

The remainder of the first few pages of Q&PA strengthens and develops this theme with respect to *seeking* (rewritten as "striving that: one finds . . ."), *hunting* (a variety of *seeking*), and finally, the first and foremost of the propositional attitudes, *believing* (which requires no rewriting in its primary use). In each case the contrast between relational and notional readings may be strikingly represented in terms of permutations of quantifier and verb.[6]

Beautiful! Another triumph for elementary logic! (And who would begrudge a little premeditated violence for so elegant an achievement?)

But wait; now comes the transition. "However, the suggested formulations of the relational [readings] . . . all involve quantifying into a propositional-attitude idiom from outside. This is a dubious business . . ."

What a downer! Why has Quine undercut his own logical triumph with gloomy doubts? One immediately thinks of the problems of interpreting modal logic and of the awful consequence of the third degree of modal involvement, namely, the metaphysical jungle of Aristotelian essentialism. But whereas the relational readings of sentences involving necessity lead into the jungle (and good riddance, says Quine), "we are scarcely prepared to sacrifice the relational constructions" that (3) and others like it are supposed to represent. Quine does not doubt that quantification into propositional attitudes makes *epistemological* sense. The opening pages of Q&PA, and in particular the contrast between (3) and (4), show us just what sense it makes.[7]

This point is so important that I will repeat it. The doubt which appears at the transition in Q&PA—and which generates all of the remaining maneuvers of Q&PA—is not a doubt about the plausibility of the underlying epistemology, in the way in which Quine's skepticism toward essentialism is a doubt about the plausibility of what he sees as the underlying metaphysics of quantified modal logic. In Q&PA, the epistemology is repeatedly said to be sensible, even indispensable. So there must be some other problem that drives Quine on, not epistemological but *logical*.

We need a bit of technicality. Call the position of a singular term within a sentence *open to substitution* if the result of replacing a term in that position by a co-referential one does not affect the truth value of the sentence. It can happen that a position which is open to substitution in a given sentence is no longer open to substitution when the given sentence is embedded in a larger sentential context. Quine has dubbed such larger sentential contexts *opaque*.[8] Now Quine's logical problem is this: the sensible epistemology of the symbolization lesson has the result that although positions within the propositional attitude constructions are not open to substitution (i.e. the sentential contexts

produced by the propositional attitudes are opaque), these same positions appear to be open to quantification from without (as in (3)). This is thought to violate principles of logic and semantics. It is said to produce a "dilemma", for when substitution is ruled out, quantification in "goes by the board". Throughout the remainder of the paper, Quine reminds us again and again that there is a *technical* problem that must be solved. At the end of section III: "In all cases my concern is, of course, with a special technical aspect of the propositional attitudes: the problem of quantifying in." We must avoid "illicit quantification into opaque contexts" while at the same time we must "provide for those indispensable relational statements of belief." This is the task of the remainder of Q&PA.

But why is it illicit, why is there a dilemma, and how do we know we can't quantify into positions not open to substitution?[9] In Q&PA Quine only hints at an argument in eleven swift lines. We are told that the failure of substitution shows that we have ceased to affirm any property of an individual at all, that such sentences are not about an individual, and that it then becomes improper to quantify in.

> If, on the other hand, . . . we rule simultaneously that
> (12) Ralph believes that the man in the brown hat is a spy,
> (13) Ralph does not believe that the man seen at the beach is a spy,
> then we cease to affirm any relationship between Ralph and any man at all. Both of the component 'that'-clauses are indeed about the man Ortcutt; but the 'that' must be viewed in (12) and (13) as sealing those clauses off, thereby rendering (12) and (13) compatible because not, as wholes, about Ortcutt at all. It then becomes improper to quantify as in ["$(\exists x)$(Ralph believes that x is a spy)"]; 'believes that' becomes, in a word, referentially opaque.

Quine's theoretical speculations here are certainly plausible, but the intelligibility of the first few pages of Q&PA provides an equally plausible concrete counter–instance. That is the real dilemma. But Quine doesn't explore *that* dilemma. Instead, he takes it as an established principle of logic (in the broad sense, including semantics) that we cannot quantify into such contexts, and tries to save as much of the first few pages as possible within that constraint.

This led me to explore Quine's relevant earlier papers for a more detailed version of his argument for the putative logical principle, and that led to my surprising discovery.

Part A: The Alleged Theorem

II

I have concluded that in 1943, in his groundbreaking work "Notes on Existence and Necessity", Quine gave an invalid argument. He believed himself to have given a proof of a general theorem regarding the semantical interpretation

of any language that combines quantification with opacity. The purported theorem says that in a sentence, if a given position, occupied by a singular term, is not open to substitution, then that position cannot be occupied by a variable bound to an initially placed quantifier. The proof offered assumes that quantification receives its standard interpretation. But the attempted proof is fallacious. And what is more, the theorem is false.

It is very important to separate the 'logical' problems raised by the alleged theorem from any metaphysical or epistemological problems raised by the interpretation of relational constructions. The former are independent of the specific nature of any particular opacity producing phrase, whereas the latter depend on the particular opacity producing notion such as *necessity* or *belief*. Quine has advanced both sorts of arguments against quantified modal logic. These arguments had, to some degree, run together in my mind and perhaps in the minds of others as well. I intend now to run them apart.

The structure of Q&PA makes it clear that, at least at that time, Quine himself distinguished these two sorts of arguments. In Q&PA, relational readings of sentences involving propositional attitudes are not problematical; they are indispensable. The alleged theorem is the problem. This problem is ultimately resolved by retreating from the early and elegant analysis in terms of *syntactical* ambiguity—the representation in terms of permutation of quantifier and verb—to the conclusion that there exists a *lexical* ambiguity in the propositional attitude verbs themselves. Thus, there is a relational *sense* of 'wishes that' which admits both substitution and quantification, and there is a notional sense which admits neither. The two senses differ in logical syntax and cannot be transformed into one another by moving quantifiers around. Indeed it is this syntactical difference which allows them both to conform to the requirements of the alleged theorem and, at the same time, to serve to do the work of (3) and (4).[10] If we describe the ambiguity of sentences as being resolved by *readings*, and the ambiguity of lexical items as being resolved by *senses*, we may say that there are two readings of the ambiguous vernacular sentence "I want a sloop", and that the two readings require different senses of the (concealed) propositional attitude verb. (Contrast this with the two readings of "Everyone is not hungry", which merely require grammatical reparsing and do not require one sense of 'not' for application to closed formulas and another for open formulas.)[11] This form of solution again demonstrates that it is a point of logical grammar, not the intrinsic intelligibility of particular relational readings that is here at issue for Quine.

It is evident that the same technique—propounding a lexical ambiguity between notional and relational senses—could be used to skirt the alleged theorem in the case of modalities. But there Quine is convinced that the metaphysical problems of interpreting the relational sense of necessity are so great that it is not worth the effort to avoid the logical problem.[12] I will not now argue with Quine's metaphysics, only with his logic.

But first I should state that although I believe Quine erred, I appreciate his ingenious attempts to avoid the consequences of his alleged theorem and to point out its consequences for the theories of others. In this undertaking he has provided us with a rich field of ideas, always fascinating and sometimes puzzling, ranging from the two senses of "belief" in Q&PA through the "stubborn objects" of *Word and Object* to the trans-world "physical objects" of "Worlds Away". It is my hope that a careful examination of the details of his semantical and logical arguments will help us to get a clearer perspective on the larger and more philosophically central issues in metaphysics and epistemology.

III

It is my intention to present what I take to be Quine's argument for the alleged theorem in a form more explicit than any in which it appears in his writings. To this extent, I speculate. My primary source, as noted above, is "Notes on Existence and Necessity" (Notes on E&N), though I state some parts of the argument in a way more reminiscent of "Reference and Modality" (R&M) and some later papers.

Notes on E&N opens and closes with passages that make it unmistakably clear that the work aims to establish general principles of logic and semantics which limit the logical form in which a theory of modality can be cast. Thus the opening two paragraphs:

> This paper concerns two points of philosophical controversy. One is the question of admission or exclusion of the modalities—necessity, possibility, and the rest—as operators attaching to statements. The other is the ontological question, "What is there?" *It is my purpose here to set forth certain considerations, grounded in elementary logic and semantics, which—while not answering either question—must seriously condition any tenable answers.*
>
> The logical notions that prove crucial to these considerations are the notions of identity and quantification; and the semantical ones are the notions of designation and meaning, which are insufficiently distinguished in some of the current literature. A new semantical notion that makes its appearance here and plays a conspicuous part is that of the "purely designative occurrence" of a name. (emphasis added)

The closing paragraph states four main conclusions:

(i) A substantive word or phrase which designates an object may occur purely designatively in some contexts and not purely designatively in others.

(ii) This second type of context, though no less "correct" than the first, is not subject to the law of substitutivity of identity nor to the laws of application and existential generalization.

(iii) Moreover, no pronoun (or variable of quantification) within a context of this second type can refer back to an antecedent (or quantifier) prior to that context.

(iv) This circumstance imposes serious restrictions, commonly unheeded, upon the significant use of modal operators, as well as challenging that philosophy of mathematics which assumes as basic a theory of attributes in a sense distinct from classes.

It is conclusion (iii) which I describe as the alleged theorem. Note that (iii) is not conditioned by any metaphysical or epistemological hypotheses. The challenge, mentioned in (iv), to the theory of attributes is again an unconditional application of the alleged theorem. "Expressions of the type that specify attributes [for example, 'the attribute of exceeding 9'] are not contexts accessible to pronouns referring to anterior quantifiers."[13]

My reconstruction of Quine's argument that the failure of substitution implies the incoherence of quantification may now be stated as follows:

Step 1: A purely designative occurrence of a singular term in a formula is one in which the singular term is used solely to designate the object. [This is a definition.]

Step 2: If an occurrence of a singular term in a formula is purely designative, then the truth value of the formula depends only on *what* the occurrence designates not on *how* it designates. [From 1.]

Step 3: Variables are devices of pure reference; a bindable occurrence of a variable must be purely designative. [By standard semantics.][14]

Notation: Let ϕ be a formula with a single free occurrence of 'x', and let $\phi\alpha$, $\phi\beta$, $\phi\gamma$ be the results of proper substitution of the singular terms α, β, γ for "x".

Step 4: If α and β designate the same thing, but $\phi\alpha$ and $\phi\beta$ differ in truth value, then the indicated occurrences of α in $\phi\alpha$ and of β in $\phi\beta$ are not purely designative. [From 2.]

Now assume 5.1: α and β are co-designative singular terms, but $\phi\alpha$ and $\phi\beta$ differ in truth value,

and 5.2: γ is a *variable* whose value is the object co-designated by α and β.

Step 6: Either $\phi\alpha$ and $\phi\gamma$ differ in truth value or $\phi\beta$ and $\phi\gamma$ differ in truth value. [From 5.1, since $\phi\alpha$ and $\phi\beta$ differ]

Step 7: The indicated occurrence of γ in $\phi\gamma$ is not purely designative. [From 5.2, 6, and 4.]

Step 8: It is semantically incoherent to claim that the indicated occurrence of γ in $\phi\gamma$ is bindable. [From 7 and 3.]

All but one of these steps seem to me to be innocuous.[15] That one is step 4 which, of course, does *not* follow from step 2. All that follows from 2 is that at least one of the two occurrences is not purely designative. When 4 is corrected in this way, 7 no longer follows.

The error of step 4 appears in later writings in a slightly different form. It is represented by a subtle shift from talk about *occurrences* to talk about *positions*. Failure of substitution does show that some *occurrence* of a term in that position is not purely referential.[16] From this it is concluded that the *context* (read 'position') is referentially opaque.[17] And thus that what the *context* expresses "is in general not a trait of the object concerned, but depends on the manner of referring to the object." Hence, "we cannot properly quantify into a referentially opaque context."[18] The shift from talk of irreferential occurrences to talk of irreferential positions links "some occurrence of a term in that position" to "all occurrences of terms in that position," and so induces the fatal step 4.

It would be easy to make the mistake in step 4 if, like Quine, one tended to see all singular terms other than variables as short for natural or contrived descriptions. There would then be no evident reason, in a concrete case of substitution failure, to discriminate between the supplanted term and the supplanting term in charging irreferentiality. There would be no reason to expect variability among terms in their disposition to go irreferential in a given position, with, say, the supplanted term purely referential but the supplanting term not.

On the other hand, it should be difficult to make the mistake of thinking that a variable cannot occupy a bindable position in which there is substitution failure for constant terms if, like Quine, one interpreted substitution failure as showing that neither the supplanted nor the supplanting occurrences were purely referential. For then, as Quine says, neither the pre-substitution sentence nor the post-substitution sentence is really *about* the referent, and hence *neither* sentence speaks to the meaningfulness of quantification in, which *is* about the referent. Far from demonstrating that quantification in is illegitimate, the diagnosis (for constant terms) of irreferential occurrence asserts the irrelevance of the test. Only if our test revealed a substitution failure in which both the supplanted and the supplanting terms had purely referential occurrences, would it show that we could not meaningfully quantify in. Given Quine's criterion, such a test result is unlikely. But the contrapositive is enlightening. It tells us that if quantification into a context:

$$. \; . \; . \; x \; . \; . \; .$$

is legitimate, then

$$(x)(y)((x = y) \supset (. \; . \; . \; x \; . \; . \; . \equiv . \; . \; . \; y \; . \; . \; .))$$

is true.

IV

In a discussion of this matter in Dubronvnik, Yugoslavia in Spring 1979, a thoughtful exponent of Quine's views (who immediately saw the fallacy in the argument as reconstructed above) put it this way: There are two kinds of variability involved. First, a given singular term can have both purely designative and non-purely designative occurrences, and second, a given position in a formula can be filled at one time by a purely designative occurrence of a term (for example, a variable) and then by a non-purely designative occurrence (for example, a definite description). In 1943, Quine saw the first kind of variability but not the second.[19]

I commented that the (tacit) assumption that there is no variability in the position was in accord with the great classical tradition of Fregean semantics. On Frege's analysis it is the *context* (that is, the position) that determines the semantics of whatever singular term occupies the position.[20]

From Frege's point of view, step 4 is correct. Alonzo Church assumes this point of view in his formalization of Frege's logic of sense and denotation. Church's formalization conforms to Quine's proscription.[21]

Church, in his review of Notes on E&N,[22] was the first to call attention to the relationship of Quine's paper to Frege's "Über Sinn und Bedeutung."[23] As will become more apparent in subsequent remarks, I see Quine, like Church, as being drawn down the same path as Frege, except that Quine travels light, without the baggage of intensional entities that is widely viewed as the hallmark of Frege's way.

In the first footnote to R&M, Quine himself identifies his notions of purely referential and non-purely referential occurrences with what he calls Frege's "*direct (gerade)* and *oblique (ungerade)* occurrences". Interestingly, Quine, typically unwilling to accept Frege's notion of indirect (oblique) *denotation* (ungerade *Bedeutung*) with its ontological commitment to senses *(Sinne)* as entities, here invents and attributes to Frege the denatured idea of an indirect (oblique) *occurrence*—definable in Fregean terms, I suppose, as one which would have indirect denotation if there were such a thing.[24]

V

So far I have not shown that the alleged theorem is false, only that my reconstruction of a proof for it is fallacious. It happens, however, that the very notions Quine uses in Q&PA to resolve the doubts caused by the alleged theorem can be used to build a counter-instance to it. This gave added poignancy to my puzzlement as to what motivated the transition in Q&PA. If the developments following the transition were correct, there was no need for them.

Quine argued from the alleged theorem to the conclusion that the propositional attitude verbs must be lexically ambiguous, concealing both a notional and—in those cases where relational readings seem to be meaningful—a relational sense (with the notional sense excluding both substitutivity and quantification in and the relational sense admitting both). His practice suggests that logic demands disambiguation. And so it does for the ambiguity between notional and relational *readings*. But once the genuine ambiguity between the readings (3) and (4) of 'I want a sloop' is resolved, what remains to do in order to 'disambiguate' the lexical item 'wish' is completely determined: (3) requires the relational sense, (4) takes the notional sense (or, what amounts to the same thing, the vacuous relational sense). Yet it was the language of (3) and (4) that was regarded as 'dubious' and as demanding reformulation. In this case, if 'disambiguation' suffices, re-ambiguation does so likewise. If we can provide meaning preserving rules which transform each logically dubious formulation into a *unique* indubitable one, then the very existence of those rules shows that the original doubts were unfounded. This does not mean that equivalent forms of language do not differ in such virtues as articulation, fluency, and user-friendliness; what it does mean is that we can quell our *logical* terrors just by viewing quantification in as the result of re-ambiguating the 'disambiguated' lexical item.

The re-ambiguated lexical item is formalized as in (3) and (4) as a single ambiguous operator phrase whose 'disambiguation' is completely determined by the presence or absence of free variables in its operand and whose interpretation *shifts*—notional where no quantification in occurs, relational where quantification in is said to require it. Substitutivity will still fail, because the test cases will be read notionally; quantification in will still be coherent because the test case will be read relationally. It is gratifying to note that the use of shifty operators has no cost in expressive power, since we could restrict the occupants of the referential positions in relational senses to variables (other cases being equivalently obtainable by quantification and identity) and since the occupants of singular term positions in the notional senses are already restricted to non-variables (unless bound internally). Shifty and shiftless formulations stand in one-one correspondance. The use of shifty operators allows us to affirm:

Ralph believes that the man in the brown hat is a spy,

to deny:

Ralph believes that the man seen at the beach is a spy,

and to find coherent:

($\exists x$) Ralph believes that x is a spy

wherein "believes that" has shifted to a relational sense.

Shifty operators are so called because they are introduced as a logician's trick, sobering (and deflating to the alleged theorem), but a trick nonetheless. They acquit quantification into opacity of Quine's charges, but they do so on the basis of a technicality, not by a substantive proof of innocence. In 1968 I coyly described the shifty operator as "An intriguing suggestion for notational efficiency at no loss (or gain) to Quine's theory."[25] But I meant more than that. I meant it to be recognized that if we interpret the symbolization lesson of Q&PA as containing shifty operators, then we both legitimize the syntax (from Quine's point of view) and *we retain exactly our naive understanding* of such formulas as (3) and (4), the naive understanding that originally gave the symbolization lesson its edifying punch.

At this point I must confess to a residual unease and to a sympathy for the now discredited but well-intentioned alleged theorem. Does re-ambiguation show that the combination of quantification and opacity is *coherent?* Re-ambiguation is a notational unification of what is conceptually disparate (another of those dubious but indispensable notions). It can be elegant fun to try to do this in a way that makes the stitching almost invisible, and it must be granted that what started as a task for invisible mending may end up in displaying new conceptual affinities, but we should not let delight in the handiwork blind us to the underlying question of conceptual coherence. It is possible that our original reading *was* incoherent (in the dubious but indispensable sense) and it is just dumb luck that, as it turns out, we can get away with it. On the other hand, we have not foreclosed the possibility of there being another conceptualization of the semantics of a notationally unfied treatment of the propositional attitudes which, unlike the logician's trick, is coherent. I think there must be such a conceptualization. Our naive understanding is too natural, and the logician's trick is too unnatural, for it to be just dumb luck.

At the time of my 1968 footnote I did not intend the logician's trick as proof that there was no *logical* difficulty with quantifying in because I did not then clearly recognize that it was a purported logical difficulty that drove Q&PA into the transition. But I recognize it now. And the trick *is* proof that the alleged theorem is no theorem, at least on the hypothesis that there is no further logical disability that affects all relational senses (but see Part D below). The logician's trick shows that quantification into a single undifferentiated notation for an opacity producing lexical item is just as secure as quantification into a special notation for a relational sense of such an item.[26]

I think Quine knows this. Looking backward in 1977 ("Intensions Revisited") he expounds the logician's trick in his characteristically elegant way, claiming that a unified notation (open to quantification in) is interdefinable with a notation for a relational sense.[27] What I miss in Quine's presentation is a candid evaluation of the bearing of this move on his old strictures regarding quantification and substitutivity. Instead, he launches a fresh attack on a new front by repudiating the relational senses, thus consciously cutting the ground out from under his own solution in Q&PA and from under the logician's trick as well.

Part B: Coherent Interpretations

VI

The relational senses segregate subject from predicate syntactically by setting predicate within the scope of opacity and subject beyond it. Semantically, they segregate individual from property (or predicate). We can achieve a coherent interpretation if we can semantically reunite individual and property in a way that makes the unified object at one with the unified objects of the notional senses. Quine's exposition of these matters tends to begin by invoking intensional entities (for their intuitive value in marking dramatic contrasts), and to conclude with a retreat—or is it an advance—to linguistic entities (for their certain structure and secure ontology).[28] So the task, if we are to follow his trail, is first, unification in the theory of intensional objects, and then, unification in the theory of linguistic objects. I believe both tasks can be accomplished, though both require deviations from dominant modes of thought. Let us begin with the intensional.[29]

VII

I have suggested that the alleged theorem, and its consequences in terms of disambiguation and the disquietingly smug re-ambiguation, flow from a Fregean outlook on problems of opacity and the nature of intensional entities. A quite distinct point of view was championed by Russell.[30]

Russell thought that all sentences stand for propositions. He distinguished two sorts of propositions. There are propositions (call them *singular*) that attribute properties directly to an individual, by having the individual itself occupy the subject place in the proposition. And there are propositions (call them *general*) in which individuals are only represented under descriptions, that is, the subject place in the proposition is occupied by a complex of properties which was said, in turn, to *denote* the individual.[31] Quantified forms were also regarded as general. In this way the form of the proposition was thought to mirror the form of the sentence. "Ortcutt is a spy" expresses a singular proposition with a simple subject, Ortcutt himself, and the property of being a spy as attribute. "The man in the brown hat is a spy" expresses a general proposition with a complex subject which contains the property of being a man and of wearing a hat, etc. If we were willing to accept the hypothesis that the meaning of a grammatically simple name is just the individual named, we could say that the subject of the proposition is the meaning of the grammatical subject of the sentence. But we need not accept that hypothesis in general. Russell didn't.

It is my thesis that the fundamental difference between Russell and Frege emerges in their views about singular propositions.[32] As I have noted, these entities are fundamental to Russell's intensional ontology. Frege was dumbfounded by the idea that a proposition, the objective content of thought, something capable of being apprehended by the mind, might contain a stark individual not represented by some mode of presentation.

In late 1904 Frege set out, in correspondence with Russell, to answer Russell's scepticism about the thesis that sentences (or perhaps propositions) stand for truth values in the way that complex definite descriptions stand for objects. (Russell had written, "For me there is nothing identical about two propositions that are both true or both false.") In a lengthy exposition of his theory, Frege remarks in passing:

> Truth is not a component part of a thought, just as Mont Blanc with its snowfields is not itself a component part of the thought that Mont Blanc is more than 4,000 meters high.

Russell responds:

> I believe that in spite of all its snowfields Mont Blanc itself is a component part of what is actually asserted in the proposition 'Mont Blanc is more than 4000 metres high'. We do not assert the thought, for this is a private psychological matter: we assert the object of the thought, and this is, to my mind, a certain complex (an objective proposition, one might say) in which Mont Blanc is itself a component part. . . . In the case of a simple proper name like 'Socrates', I cannot distinguish between sense and Bedeutung; I see only the idea, which is psychological, and the object.[33]

This is not the place to enter into an exact analysis of Frege's and Russell's theories of intensional entities, nor is it the place to defend Russell's theory or his understanding of Frege's theory. Let me just assert that despite Frege's incredulity,[34] current theories of reference suggest that Russell's ideas provide the more natural interpretation of what is expressed by everyday utterances involving proper names, indexicals, and demonstratives. And, most importantly for our purposes, they provide for the first step in unification, unifying subject and predicate. We can unite the property *being more than 4,000 meters high* with Mont Blanc itself (with all its snowfields) to form a single object of thought.

Once the objects of propositional attitude constructions contain individuals as components, quantification breezes in.

It seems quite clear that for Russell, the existence of singular propositions did not depend on there being sentences which expressed them. He increasingly narrowed the range of what he called *logically proper names* (names whose meaning is just the individual named) and ultimately came to regard most grammatically simple names as disguised or abbreviated complex descriptions. In this he followed Frege. But in Russell's ontology the singular propositions,

even if unexpressed, retain a kind of pre-eminence. This is because his analysis of even those general propositions expressed by closed quantified sentences depends on his notion of a propositional function, which is nothing more than a function from individuals to singular propositions containing them.

As I see Russell's intensional semantics, it recapitulates extensional semantics by analyzing the intension of quantified sentences in terms of the intension of open sentences under assignments of values to free variables. An open formula expresses a singular proposition for every assignment of values to its free variables. If we hypostatize the *way* in which a given open formula associates singular propositions with values of its variable, we obtain a propositional function. The closure of an open formula expresses the attribution of a second order property to the propositional function associated with the open formula. Thus singular and general propositions are related as open to closed formulas and perhaps, given Russell's remarks about the simple proper name "Socrates", as instances to generalizations. This is the second step in unification, uniting the singular propositions with the general.

If we adopt this Russellian point of view, we can smooth the awkwardness of the logician's trick. Phrases like "believes that" and "wishes that" are thought of as standing for relations between the individuals designated by their subject and the propositions expressed by their sentential complements. Perhaps it would be more perspicuous to recut these phrases so as to capture more graphically the idea that they relate two entities, a person and a proposition. We regard "that" as an opacity-producing sentential operator. Applied to an open or closed sentence, it yields, under an assignment of values to variables, a name of the proposition expressed, under that assignment, by the sentence. We regard "wishes" as a relation between persons and arbitrary propositions. Thus (3) becomes:

(5) $(\exists x)(x$ is a sloop . Wishes (I, That [I have x])

and (4) becomes:

(6) Wishes (I, That [$(\exists x)(x$ is a sloop . I have $x)$]

The two steps in unification are seen in the notation. "That", operating on open sentences, yields a name of a singular proposition, thus unifying subject and predicate; the use of the relational "Wishes", with a place for arbitrary proposition names, unifies singular and general propositions.

VIII

Quine's familiar method for moving from intensional objects to linguistic ones amounts to replacing the "That" operator with quotation marks. (6) is transformed into:

Wishes (I, "$(\exists x)(x$ is a sloop . I have $x)$")

which is read something like:

I wish-true "$(\exists x)(x$ is a sloop . I have $x)$"

In Q&PA and again in "Intensions Revisited" Quine raises, and replies to, various objections to this transformation.[35] Those objections are not at issue here. But Quine himself would object to the transformation of (5) into:

$(\exists x)(x$ is a sloop . Wishes (I, "I have x"))

insisting that the quantifier cannot bind the final occurrence of "x" through the opacity of quotation. That sounds like the last stand of the alleged theorem. Let's try to work around it.

There is a natural move to make. We resort, as before, to the familiar notion from extensional semantics: an assignment of values to variables. We replace

Wishes (I, "I have x")

which was read:

I wish-true "I have x"

with

(7) Wishes (I, "I have x" , y)

(with quantifiable "y") which is read:

(8) I wish-true "I have x", with respect to y as value of "x".

This, in effect, is exactly where Quine comes out in Q&PA. He would read (7) as:

I wish "I have x" to be satisfied by y

in which the words "wish to be satisfied by" are viewed as an irreducibly triadic predicate. (I have reason for preferring the reading (8) as will become clear below.) The last stand of the alleged theorem has forced us back to the syntax of a relational sense, segregating subject and predicate. Drat!

Can we again do the logician's trick and stitch together the dyadic "wishes-true" with the irreducibly triadic "wishes to be satisfied by"? Here, Quine has pointed the way in the very first example in Notes on E&N. He there demonstrates how two occurrences of an expression, one purely designative and one within quotes, can be consolidated into a single occurrence. He (implicitly) urges these efficiencies upon us with the encouraging remark that "it is easy, in fact, to translate"

Giorgione was called "Giorgione" because of his size

into

Giorgione was so called because of his size.

We will follow Quine's recommendation and interpret our new quotation device using his *method of consolidation*.

We introduce the new quotation device: *arc quotes*, ⌜ ⌝, in a way that results in the expressions:

⌜I have x⌝

⌜x has y⌝

⌜$(\exists x)$ I have x⌝

being taken to abbreviate, respectively:

"I have x" with respect to x as value of "x"

"x has y" with respect to x as value of "x", y as value of "y"

"$(\exists x)$ I have x"[36]

What we have achieved is not quite shifty quotation. An open formula enclosed in arc quotes is not regarded as a well-formed part of the larger expression within which it stands. Instead it is regarded as a syncategorematic expression which in combination with an operator phrase produces a shifty operator. Using arc quotes we can now rewrite an instance of the Quine-like (7) as:

Wishes (I, ⌜I have x⌝)

with quantifiable "x". Quine would surely no longer object to the transformation of (8) into:

$(\exists x)$(x is a sloop . Wishes (I , ⌜I have x⌝))

A dream realized: quantifying into quotes!

Again we have a logician's trick, a reorganization of notations to smooth the surface, but with no reorganization of the subject matter. We have been syntactically creative but ontologically conservative. We are left with a shifting relation between surface and subject. Can we replace the logician's trick with a coherent interpretation of our newly smoothed notation?

IX

The first step amounts to reparsing and slightly rephrasing (8) to bring it into the form:

I wish-true ("I have x" under the assignment: y to "x")

in which

("I have x" under the assignment: y to "x")

or, for short:

("I have x" under y to "x")

is brought together as a single well-formed unit. We also reinterpret arc quotes accordingly. The genius of grammar has brought us to the discovery of a new kind of sentence, the valuated formula (or, more generally, the valuated well formed expression). A valuated formula is an open formula under an assignment of values to its free variables.

It is clear that valuated formulas are a unity of individual and predicate. Furthermore, they are naturally thought of as a kind of sentence (i.e. closed formula). Open formulas cannot do the heavy truth-bearing work of sentences. They cannot even do the light sentential work of proclaiming propositions. They are incomplete, a way-station on the road to sentences and a mere artifact of one way (admittedly, a now traditional way) of doing syntax. There are two parallel ways of completing them: closure (the syntactic way) and valuation

(the semantic way). Both yield results capable of sentential tasks. Valuated sentences are the linguistic (linguistic?) analogues of singular propositions.[37] Don't be bothered by the fact that Mont Blanc (with all its snowfields) can be a constituent of such a sentence; sustain yourself with the thought that all of theoretical science is subject to revision.

Before proceeding, we must settle a critical issue concerning the individuation of valuated formulas (and other valuated expressions). Let v_1 and v_2 be distinct variables, and let Γv_1 be an expression containing v_1 as its only free variable and Γv_2 be the result of replacing free occurrences of v_1 in Γv_1 by free occurrences of v_2. Does Γ satisfy the axiom:

Axiom (A) $(x)((\Gamma v_1$ under: x to $v_1) = (\Gamma v_2$ under: x to $v_2))$

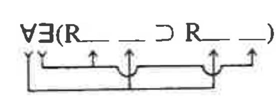
where Γv_1 and Γv_2 might even just be the variables v_1 and v_2?

There is a choice. Associative valuation associates a value with each free occurrence of a variable but leaves the variable in place. Valuation by substitution replaces each free occurrence of a variable with its value. (We are not practiced in substituting non-linguistic objects for expressions, so valuation by substitution must be done carefully.)[38] Associatively valuated expressions, as most naturally conceived, do not satisfy Axiom (A). Expressions valuated by substitution do. Henceforth, when I speak of valuation, I always mean valuation by substitution. One consequence of Axiom (A) is that arc-quotation is well behaved.

(B) $(v_1)(v_2)((v_1 = v_2) \supset (⌜\Gamma v_1⌝ = ⌜\Gamma v_2⌝))$

Having finally achieved quantification into quotation, we wouldn't want it to turn out to be deviant.

The deviance we are talking about here is no minor peccadillo. It goes to one of our central issues: that all bindable occurrences of variables are purely referential. If (B) fails, (and "=" is not 'funny'), at least one of v_1, v_2 has a non-purely referential occurrence. This *is* incoherent. Variables serve only to mark places for distant quantifiers to control and to serve as a channel for the placement of values. We need no variables. We could permit gaping formulas (as Frege would have had it) and use wiring diagrams to link the quantifier to its gaps and to channel in values.[39]



Variables are simply a way of giving the distant quantifiers wireless remote control over the gaps. Variables must not allow their idiosyncratic graphics to become ideography.

Arc-quotation is now seen not as a notational trick, a contextually defined piece of a shifty operator, but as a proper, opacity producing operator. Given an expression Γ, the result of surrounding Γ with arcs is a singular term whose

free variables are the free variables of Γ and whose value, for any assignment f of values to its free variables, is the valuation of Γ under f.[40]

X

Quine saw how Frege's intensional ontology (though not so described) explained opacity and rejected quantification. He also showed us how the familiar ontology of linguistic expressions can do the same. I have aimed to describe modifications to the two ontologies which allow them to accept (and even to explain) quantification while leaving intact the prior explanation of opacity. Each modification involves two steps of unification: first, the unification of individual and property (or predicate) by enlisting, or creating, a new kind of entity containing individuals, and second, the assimilation of the new entities to the old. The success of my project—to achieve conceptual coherence—depends on the degree to which each step seems natural.

It will not have escaped notice that valuated sentences are virtually the singular propositions they express. They give us structure. They give us individuals. They bear truth (with respect to their language).[41]

I now propose to downshift from my vivid intensionalist talk to dry linguistic formulations involving valuated sentences. For most of the remainder I will stay in low gear, not only to preach to the unconverted but to manifest how much can be accomplished with one foot on the ground. Where it is worth a reminder that the class of sentences includes both the *closed* and the *valuated*, I shall refer to them as *$entences*. Note this relativity: what $entences there are depends on what values the variables can take. For the most part I ignore this relativity, assuming they can take all and only what there is.[42]

The *method of $entences*, as I shall call it, amounts to interpreting intensional operators as if they were predicates of $entences and interpreting the sentence within the scope of the operator as if it were contained in arc quotes.

XI

I pause for a methodological sermon. We interpret the sentence within the scope of the operator *as if* it were an arc-quotation name. We do not regard it syntactically as a name. Our semantical methods need not dictate syntactical form. I do not propose to reform the syntax of our imagined formal object language, treating operators as predicates and their sentential complements as names (i.e., singular terms). *Nominalization*, as I will call such a syntactical reform, would amount to more than merely calling certain expressions "names"; it would amount to regarding certain syntactical positions as open to

occupation by variables and descriptions in addition to their traditional occupants.[43] It is a loosening of grammatical constraints. Nominalization would certainly increase expressibility, but it carries several hazards.

To the degree to which we regard our semantical methods as model-making (i.e., as a way of analyzing the notion of logical consequence for the object language) rather than as reality-describing (i.e., as analyzing the intended interpretation), fine-tuning the object language to bring it into conformity with our model may end up institutionalizing an artifact of the model that corresponds to no aspect of reality. I often think that my Platonizing model-making is artificial, but I see nothing objectionable in being realistic about the artifacts *qua* artifacts. We model-makers love our artifacts. Models have their own reality, and the more we acknowledge that, the less likely we are to confuse the reality of the model with the reality it models. Model-making, by helping to articulate structure, can help to make it more acceptable that there is a reality behind questioned linguistic forms. (For example, that there *is* relational belief or even that there are singular propositions.) But one can accept the linguistic forms and the logic induced by the model, without thinking that there must be 'hidden' aspects of the reality that correspond to unexpressed structural features of the model. In particular, the very ontology of the model, whether propositions, possible worlds, or $entences, need not mirror any aspect of the reality expressed in traditional formulations of modal logic or of the logic of propositional attitudes. So here is the first hazard of nominalization. With more that we can say, we may say too much.

Where the entities interpreted as values mirror the syntactical structure of the expressions, as in the case of our $entences, a further hazard attends nominalization. The change in syntax produces a change in the entities themselves. This becomes clear in the case of iteration. Tarski has taught us what profound consequences attend the shift of syntax which transforms the innocuous sentential operator "it is true that" into a predicate of sentences.[44] Montague has shown the same for the sentential operator "it is necessary that",[45] and, with Kaplan, for a version of the sentential operator "K knows that".[46] Any reform of syntax from sentential operator to predicate of sentences must be constrained by what we may think of as *Montague's Threat:* that if iteration of the operator is reformed in the natural unramified way, reflexive reference will strike.[47]

I am not advocating that we invariably avoid the shift to predicate/name form. The operator form of *truth* is a bore, and we may wish to set the interesting and important problem of analyzing such apparently nominalized idioms as "She says that whatever you say is false". But our task was to find semantical methods to interpret a *given*, putatively puzzling, syntactical form: quantification into opacity. I want to solve *that* problem before going on to the 'more interesting' problem. We certainly don't need to construct a formalism just to fully articulate the structure of the new entities we have introduced; the

metalanguage already does that adequately.[48] Opacity is tough enough to deal with, even when the machinery stays behind the curtain.

XII

Here is a case of denominalization that throws light on the method of $entences. Consider the possibility of incorporating the quotes that usually accompany the predicate "says" of *direct* discourse into an operator **Says-quote,** and thus transforming:

Ralph says "Ortcutt is no spy"

into:

Ralph **Says-quote** Ortcutt is no spy

Here we have a backwards syntactical reform, from predicate to operator form, with no reform in interpretation. There is, of course, a loss in explicitness and expressibility. Most importantly, for our purposes, there is the opportunity, indeed the temptation, to create nonsense by quantifying in. This is the temptation that Quine has inveighed against. It is correct that the method of $entences never resists quantification in strictly on the grounds of ungrammaticality or 'nonsense'. But the model-theoretic intelligibility of:

$(\exists x)$ Ralph **Says-quote** x is a spy

doesn't require that any such sentence be true. Here is our fallback position. **Says-quote** is true of no valuated $entences. We take the hard line. Intelligible, yes; true, never!

Nonsense vs. falsehood is often a close call. The method of $entences opts for falsehood. What should we say about the standard direct discourse formulation:

$(\exists x)$ Ralph says "x is a spy"?

We should say that the second occurrence of "x" is not bound to the initial quantifier,[49] the initial quantifier is therefore vacuous, and unless Ralph is in a logic class the sentence is almost surely false. So the standard formulation also opts for false.

Truth or falsity in the standard formulation depends on what sentences, including open sentences, are in the extension of the predicate "says". Truth or falsity in the operator formulation depends on what $entences, including valuated $entences, are in the extension of the operator **Says-quote.** We have not included open sentences among the non-valuated $entences, but we could have by using a different style of variable for quantifying into arc-quotation. So we can imagine that the $entences include all the sentences and more. If we interpret **Says-quote** as having the same extension as "says", we have denominalized the syntax with no shift in interpretation.[50] No shift in interpretation implies no valuated $entences in the extension of the operator.

operator. This is what I call taking the hard line. In the case of **Says-quote** it seems reasonable, since it is reasonable to think that we cannot say (in the direct discourse sense) valuated $entences.[51] In the case of operators not arising from denominalization, it may be less reasonable to take the hard line. But there is nothing in the method of $entences to rule it out.

Having brought direct discourse into the operator form, **Says-quote,** we may compare it with the indirect discourse operator, **Says-that,** which arose in this form. I think it reasonable to count as true some quantifications into **Says-that.** Thus, I take no hard line on *indirect* discourse. Still one would expect the extension of **Says-that** to be dependent on the extension of **Says-quote,** exactly how, depends in part on the resolution of the problem of *exportation*[52] and in part on how literal indirect discourse is required to be.[53] One expects these two operators to differ independently of the hard line.

XIII

The method of $entences provides generally for quantification into opaque contexts but says nothing specific about which $entences are in the extension of any particular opacity producing operator. That is a matter for the interpretation of the particular operator.

The method of $entences imposes no 'closure' conditions of any kind on the extension of an operator, not even that if "$(\exists x)(x$ is a spy)" is in the extension, then so must "$(\exists y)(y$ is a spy)" be. Closure conditions would likely make it impossible to represent direct discourse as an operator, since even the simplest equivalence transformations may fail.[54] Closure conditions have also been thought to be a burden on the attempt to represent certain epistemic notions in operator form, since we may lack the acumen to close our beliefs.[55] I think there should be no closure conditions for arbitrary intensional (i.e., opacity producing) operators, although some intensional operators, like the modal operators, may have closure conditions of their own.

Consider the language formed by adding intensional operators to the language of first order logic. We can construct models for this language by adjoining to a model M for first order logic an appropriate extension for each operator **O.** If the operator has no special laws of its own, any set of $entences of M (i.e., $entences whose 'objects' are drawn from the domain of M) is appropriate. An assignment f satisfies $\ulcorner \mathbf{O}\Gamma \urcorner$ in a model, if and only if the valuation of Γ by f is a member of the extension of **O** in the model. If no valuated $entences are in the extension of **O** in a particular model, then no quantifications in will be true in that model.

Let us call the logic of this language *first order intensional logic*. In the

absence of closure conditions, we would expect an intensional operator to behave as if it were no more than a new non-logical non-truth-functional sentential connective. (Which is what it is.)[56] We would still expect the basic laws of first order extensional logic to hold (but without any 'anomolous adjuncts' such as primitive rules permitting instantiation to terms other than variables). If we assume no closure conditions, these laws wouldn't hold *within* opaque contexts, but then application of the basic laws of logic to subformulas has always been, at best, a derived rule whose derivation depended on the laws governing the possible contexts of subformulas. Both quantifier and identity laws would, of course, reach *into* the opaque contexts.

You can see where I am headed. I conclude that there is a general logic for the addition of opacity producing operators to first order logic, and it turns out to be: first order logic. This, I think, was the viewpoint of Barcan and Marcus when they invented axiomatic quantified modal logic. They aimed just to add the modal operators to good old first order logic, along with some laws specific to modality.[57] There are subtleties in the way in which good old first order logic is to be formulated, but that doesn't vitiate the point (if I am correct) that the logic should be traditional.[58]

The situation, it seems to me, is analogous to that of quantification theory. If the rules of monadic quantification theory are properly formulated, no changes are required for full quantification theory. All that is required is an enrichment of the language. The logic, in this sense, remains the same. This does not prevent the metalogical situation from being quite different. The enriched language requires an enriched semantics, and yields new and changed metalogical results. The enriched language of first order intensional logic also requires an enriched semantics, and will certainly affect metalogical results (for example, derived rules involving definite descriptions). Thus, my thesis: first order intensional language is an enrichment of first order extensional language, but first order intensional logic *is* first order extensional logic.

Part C: Essentialism

XIV

In 1953, in "Three Grades of Modal Involvement",[59] a new theme appears in Quine's writing. He appears to retract the alleged theorem, the *logical* problem. He remarks that quantification into modal contexts "is not *prima facie* absurd if we accept some interference in the contextual definition of singular terms. The effect of this interference is that constant singular terms cannot be manipulated with the customary freedom, even when their objects exist."[60] A new charge is leveled. "There is yet a further consequence, and a particularly strik-

ing one: Aristotelian essentialism." Those who would quantify into modal contexts must be prepared to adopt an invidious attitude toward certain ways of specifying an individual, counting some attributes of a thing as essential, and others accidental. The ground has shifted from the logical legitimacy of quantifying into opaque contexts to its philosophical consequences.

What truth is there in the charge that essentialism is a consequence of quantified modal logic?

To apply our methods to quantified modal logic we must provide an interpretation for the necessity operator. This amounts to finding a plausible classification of the $entences into those which are necessary and those which are not. As noted above we *could* view all modal operators as being false of any valuated $entence. (We would lose the usual interdefinability of "$\Box$" and "$\Diamond$" when either governs an open sentence.) It would be a hard line. It wouldn't be plausible. So let us proceed.

Let me make two simplifying assumptions. First that our quantified modal language is, as is usual, the language of first order logic with identity and descriptions and with the addition of the necessity operator "$\Box$". Second, that there are no iterations of necessity. Hence, that which occurs in the scope of "$\Box$" is a purely first order formula without occurrences of "$\Box$". This is an unusual assumption made to avoid technical complications; iteration has not been the focus of Quine's concerns.[61] Given these two assumptions, we can take the problem to be to classify the $entences of the language of first order logic.

There is a simple and natural way to do this: classify by *logical truth*. A $entence is logically true if it is true in every model. The valuation of Γ under f is logically true, if f satisfies Γ in every model. There is a technical detail here I do not wish to scant. In the case of valuated formulas, logical truth requires truth even in domains which do not contain the values assigned to free variables. Assigning me to "x" yields a valuation of:

$[(y)\ y \text{ is unmarried} \supset x \text{ is unmarried}]$

which is not true in the domain of bachelors.[62] So formulas like:

$[(y)\ Fy \supset Fx]$

whose universal closures are logically true may have valuations that are not logically true. In fact, no valuation of this formula will be logically true. This calls for some adjustment in our usual semantical ways, but nothing difficult.

$((\exists y)(y = x) \supset [(y)\ Fy \supset Fx])$

$(Fx \supset Fx)$

$(x = x)$

are all logically true under all assignments.

$(Fx \supset Fy)$

$(x = y)$

are logically true under just those assignments that assign the same value to "x" and "y".

For the model-wary we can express logical truth for valuated formulas in terms of first order provability. We can also thereby gain some insights into the notion. Let ϕ be a formula containing the distinct free variables $v_1,\ldots,v_n$, and let f be an assignment of values to these variables. We can capture the valuation of ϕ under f in different domains by relativizing all variable binding operators in ϕ to a new monadic predicate π not already occuring in ϕ. For the familiar operators of first order logic, the quantifiers and the descriptions operator, this is done in familiar ways.[63] Let the result be ϕ^π.

One way in which logic is not invidious is in *the fungability of individuals*. Thus if the valuation of ϕ by f is logically true, any valuation of ϕ by an isomorphic assignment g (which maintains the same relative identities and diversities among the values of $v_1,\ldots,v_n$) will be logically true also. We can capture the isomorphism class by means of a conjunction of identity and non-identity formulas for the variables. Let I^f be the conjunction (in some fixed order) which contains, for every pair i, j (i, j $\leq$ n) such that $f(v_i) = f(v_j)$, the conjunct $\ulcorner(v_i = v_j)\urcorner$, and which contains for every i, j such that $f(v_i) \neq f(v_j)$, the conjunct $\ulcorner(v_i \neq v_j)\urcorner$. Now form the universal closure of the conditional with I^f as antecedent and ϕ^π as consequent. If we wish to exclude the empty domain, we can add $\ulcorner(\exists x)\pi x\urcorner$ to the antecedent.[64] The result, a closed sentence, will be a logical truth in the ordinary sense, if and only if the valuation of ϕ by f is true in every model.

Let's try it. The valuation of the formula:

(9) $(\exists z)(z = x \equiv z \neq y)$

by any assignment f such that

(10) $f(``x") \neq f(``y")$

has as its corresponding closure:

$$(x)(y)[((x \neq y) \,.\, (\exists x)\, Fx) \supset (\exists z)(Fz \,.\, (z = x \equiv z \neq y))]$$

which is not a logical truth. Hence, no valuation of (9) by an assignment satisfying (10) will be a logical truth. Intuitively, any valuation of (9) by such an assignment f, will be false in every model in which neither f("x") nor f("y") is an element of the domain. In that case every element of the domain will be different from f("y"), but none will be identical with f("x").

We have characterized a class of $entences, the class of logical truths. By the method of $entences, we can interpret "$\Box$" as true of exactly the members of this class. We might call this weak form of necessity *logical necessity*.

Quine should be relatively happy with this interpretation of necessity. He was relatively happy to call the logically true *closed* sentences necessary; he just didn't see how to extend the notion of logical truth to valuated formulas. So far, so good. Now, where's the essentialism?

XV

Curiously enough, essentialism is to be found in our notion of logical necessity. Not the Invidious Aristotelian kind (you will recall the fungability of individuals), but the Benign Quinean kind.

Note first that the acceptance of *singular properties*, i.e. those which have an individual as a component, follows unto the acceptance of singular propositions as two follows unto one. In a similar way the acceptance of *valuated predicates* follows on the acceptance of valuated formulas. For any individual *a*, we have the singular property of *being a* which uniquely characterizes it, and we even have the valuated predicate:

("$(x = y)$" under the assignment: *a* to "y").[65]

According to our theory of logical necessity, such uniquely characterizing properties are essential to their bearers.[66] Thus they confirm the presence of essentialism in our system.

It is Marcus's law[67] for modal logic:

$$(x)(y)((x = y) \supset \Box\, (x = y))$$

(a validity of the logic of logical necessity) that demands the presence of this form of essentialism. Benign Quinean Essentialism is Quinean because of Quine's unswerving insistence on Marcus's law (which is said, in "Reply to Professor Marcus", to follow from "$\Box\ (x = x)$" by 'substitutivity').[68] He admonishes us that even if we were to ignore his strictures against quantifying into positions that resist substitutivity of identity for descriptions, "this does not mean violating substitutivity of identity for variables, which would simply be a wanton misuse of the identity sign."

Benign Quinean Essentialism is benign because it makes a specification of an individual essential only if it is logically true of that individual. It is not that benign essentialism fails to discriminate among the attributes of a thing. Every modal logic will discriminate between the attribute of *self-identity* and the attribute of *self-identity while P* (*P* being any contingent truth). But discrimination in favor of logical truth hardly seems invidious. *You can't be harmed by logical truth.*[69]

XVI

Quine seems not to have noticed our modest logical necessity. He may have thought that logical truth couldn't be extended to valuated formulas directly; that it was only by way of a closed surrogate that a valuated formula could be counted logically true. The use of surrogates is a general method for the interpretation of quantification into opaque contexts. It was my method in "Quantifying In".

The simplest way of forming a surrogate, though by no means the only way, is to associate with each value of the variables (or as many as possible) a *proxy name* (i.e., a closed singular term), and then to substitute for each free occurrence of a variable in the open formula the proxy name of its value. Because of opacity (i.e., the fact that different names of the individual will result in different answers to questions of logical truth for the surrogate), we must discriminate among the names of a thing and cannot indifferently rely on any name to serve as proxy. Thus rears essentialism of the invidious kind. Something like the intuitive idea of a tag (Marcus)[70] or a rigid designator (Kripke)[71] may guide our choice of proxy names. But however we choose, the resulting proxy name could hardly fail to *appear* essential, since if α is any name, the truth of the sentence

$$(x)((x = \alpha) \supset \Box (x = \alpha)$$

which seems to express the fact that α is an essential name, reduces to the truth of:

$$\Box (x = \alpha)$$

under an assignment to "x" of the individual for which α is name. And if α is a proxy name, the truth of this formula under that assignment is *defined* by the truth of:

$$\Box (\alpha = \alpha).$$

Another way to form a surrogate is to associate with each value of the variables (or as many as possible) a proxy predicate, possibly compound, expressing a condition which specifies the individual, and then to relativize each free variable in the open formula to the predicate which is proxy for its value. There are actually two ways of doing this, with universal and with existential quantifiers, but because the existential form would lead to the obviously unacceptable result that no valuated formulas are logically true, it is natural to choose the universal form. If "Gx" were the open formula valuated by the assignment of an individual a to "x", and "F" were the proxy predicate expressing a condition which specifies a, then the valuated formula

("Gx" under the assignment: a to "x")

has as its surrogate

$$(x)(\mathrm{F}x \supset \mathrm{G}x)$$ [72]

Again we cannot indifferently rely on any arbitrary specifying conditions to serve as proxy since some may make the relativized surrogate logically true and others not.[73] Essentialism again appears inevitable, since if "F" is any proxy predicate, the truth of the sentence

$$(x)(\mathrm{F}x \supset \Box\, \mathrm{F}x)$$

which seems to say that the property expressed by "F" is essential to whatever has it, is ultimately *defined* by the truth of

$$\Box\, (x)(\mathrm{F}x \supset \mathrm{F}x).$$

Quine hasn't spelled out his argument in exactly this way, in terms of surrogates for valuated formulas, but I think it may well be what he thought. At any rate, in connection with logical necessity it's wrong. There is no need for surrogates. We can classify the logical truths among valuated formulas directly, as we have. And for this we needed no *essence of Ortcutt* other than Ortcutt.

A final point on the method of surrogates: I have been careful to hedge by saying that the method 'appears' to make essentialism inevitable. It doesn't really. We can choose surrogates on any basis we like. Once we explain honestly how we are interpreting quantification, a kind of semi-substitutional interpretation, the question is no longer "Why do you think of that specification as essential to that individual?", but is rather "What made you choose that specification as proxy for that individual?". To which the answer *may* be, "Because I think it essential to her." There's the essentialism.

XVII

Perhaps the reason no Invidious Aristotelian Essentialism has shown up is that our weak logical necessity yields too anemic a modal theory to concern Quine. Quine expects the champion of modal logic to insist of nine that it is necessarily greater than seven.[74] So let us consider a case where I.A.E. appears by invitation. I suggest that, far from being foisted upon us by a desperate semantics, I.A.E. is entirely within our control and has its uses as a means to express widely shared, and justifiable, convictions about the natures of things.

Quine would not agree. Despite his careful advice to the modalist: to insist of nine, *independently of mode of designation*, that *it* is necessarily greater than seven, he continues to believe, in Marcus's memorable phrase, "that modal logic was conceived in sin, the sin of confusing use and mention", and he hints that the confusion, though not *required* of modal logicians, still sustains them. Moreover, he is confident that I.A.E. is wrong. He describes talk of a difference between necessary and contingent attributes of an object as "baffling—more so even than the modalities themselves" (the 'objects' he has been discussing are nine and Ortcutt). He says that one attributes this distinction to Aristotle. "But, however venerable the distinction, it is surely indefensible."[75] He seems highly sceptical that there could be reasonable arguments, even in limited cases, for I.A.E. It is such arguments that I now wish to take up.

Consider modalized set theory and the intuitively plausible I.A.E. claim that singleton Quine would not exist if Quine did not:

$$(x)(y)[(x = \text{Quine} \,.\, (z)(z \in y \equiv z = x)) \supset \Box(\sim (\exists w)(w = x) \supset \sim (\exists w)(w = y))]$$ [76]

We can argue for this claim by asking whether there are plausible alternatives, alternatives that allow singleton Quine to exist where Quine does not? One immediately thinks that if singleton Quine were to exist and Quine not, then

singleton Quine would have no members. But there already is a set which has no members, the null set. Would singleton Quine then be identical with the null set? (*Was* singleton Quine identical with the null set on June 25, 1808?) Wouldn't this violate:

$$(x)(y)((x \neq y) \supset \Box (x \neq y)) \ ?$$

If singleton Quine could be identical with a null set, could our own null set conceal distinct fused possibilia, say, the singletons of Quine's merely possible seventh and eighth sons? Wouldn't this violate

$$(x)((x = y) \supset \Box (x = y)) \ ?$$

Maybe Quine's singleton could be empty without becoming identical with any other thing. (It may appear empty because we count only 'existing' members.) Then there would be at least two (apparently) empty sets. This has the consequence that the axiom of extensionality is, at best, only contingently true, and probably not even that. Unacceptable!

So far, this little bit of reasoning—admittedly not definitive—has used only modest methods: some benign essentialism plus the necessity of the axiom of extensionality.[77] It favors the conclusion that sets have their members essentially, at least in the weak sense:

(11) $(x)(y)[x \in y \supset \Box ((\exists z)(z = y) \supset ((\exists z)(z = x) \,.\, x \in y))]$

It wasn't a proof, of course, but it should be responsive to the claim that (11) is 'baffling'.[78]

I think that (11) is true, but I am willing to listen to argument. The arguments may not be compelling, but I am convinced such arguments are legitimate. They turn on our understanding of the nature sets. The issues are metaphysical, not mere points of logic and certainly not mere confusions of use and mention. I studied section 4 of *Mathematical Logic* as a freshman, and taught it as a graduate student. Confuse use and mention? Me? Never!

My acquiescence in (11) and even my connivance at argument for it do not imply that I regard every I.A.E claim that can be expressed in the language of quantified modal logic as accessible to reasoning of a similar kind. Could Richard Nixon have been a turnip? This matter does not seem ripe for debate. It seems to call more for decision than for argument. Either decsion will have consequences. This is a matter of (modal) logic. But I see little present reason to call one or the other decision correct.

XVIII

The logic of logical necessity is exhaustive, in the sense that for every sentence of the form $\ulcorner \Box \phi \urcorner$, either it or its negation is true in every model when "$\Box$" is interpreted as logical necessity (for the $entences of that model). (And incidentally, this logic is not axiomatizable, for if it were, the non-theorems of first

order logic could be axiomatizable and thus the theorems decidable.) By its exhaustiveness, the logic of logical necessity excludes I.A.E. No matter how sympathetic to this goal, we can perhaps agree that rulings on I.A.E. should be a matter of metaphysics, not logic. What this shows is that I.A.E. makes its claim under an interpretation of "$\Box$" other than logical necessity. (This we knew already, since logical necessity is benign.) Let us call this interpretation *metaphysical necessity*. I would not attempt to characterize the truths of metaphysical necessity, but I will try to characterize its logic. I think that the logical features of metaphysical necessity are just these: truth and closure under logical consequence.[79] This leaves it open that some metaphysican may assert that all truths are metaphysically necessary. It wouldn't be the first time. And it wouldn't be an abandonment of modality, just a peculiar doctrine about it, an extremely pervasive sort of metaphysical determinism. Logical closure and truth also leave it open that some metaphysician may assert that there are no metaphysically necessary truths beyond the logical truths. So be it.

If we use "$\boxed{L}$" to signify the logical necessity whose truth theory was given in section XIV, we can adopt "$\boxed{M}$" to signify the metaphysical necessity whose truths we debate. In a model, an appropriate extension for "$\boxed{M}$" is any set of first order $entences of the model that is closed under logical consequence and all of which are true in the model. $\boxed{M}$ is bounded on the bottom by $\boxed{L}$ and at the top by falsehood. It is not unreasonable, and it may be Quine's position, to argue that there are no properly metaphysically necessary truths, briefly, that

$$\boxed{M} = \boxed{L}.$$[80]

XIX

Quine's first argument, involving the alleged theorem, was an argument against the intelligibility of the language of quantified modal logic. His argument charging invidious essentialism is not an argument against the intelligibility of the language; it is an argument against the truth of certain modal statements. In the "Discussion on the paper of Ruth B. Marcus"[81] he says, "I'm not talking about theorems, I'm talking about truth, I'm talking about true interpretation. . . . [I]n order to get a coherent interpretation one has got to adopt essentialism . . ."

The earliest appearance of Quine's essentialism argument seems to be at the end of "Three Grades of Modal Involvement" (1953).[82] There, Aristotelian essentialism is first bruited in terms of essential rationality and accidental two-leggedness. We could formalize thus:

$$(\exists x)(\Box\, x \text{ is rational} \,.\, x \text{ is two legged} \,.\, \sim \Box\, x \text{ is two legged})$$

Heady stuff. Insofar as this *form:*

$$(\exists x)(\Box Fx \,.\, Gx \,.\, \sim \Box Gx)$$

is all there is to Aristotelian essentialism, quantified modal logic is infested. Since, as Quine quickly shows, if "P" stands for any contingent truth, it will be true that

(E) $(\exists x)(\Box (x = x) \,.\, ((x = x) \,.\, P) \,.\, \sim \Box ((x = x) \,.\, P))$

Clever, but hardly likely to quicken the pulse or, for that matter, to 'baffle' anyone. If this is a metaphysical jungle, then so is every logic classroom in Harvard University.

I cannot believe that benign essentialism of the kind exhibited in (E) could have been Quine's target. His concern must have been that (E) opens the door to the heady stuff, to real I.A.E., not just to the 'form' of I.A.E. The argument charging essentialism must come down to this: (i) Adoption of a relational sense of necessity (or acceptance of quantification in) permits one to formulate I.A.E. claims. (ii) Those who adopt such a sense must wish to assert such claims. (iii) Such claims are unjustifiable. Viewed in this way the argument shows itself to be an *ad hominem: those who would foist this logic upon us are just the kind to foist some notorious falsehoods*. This may well be true, but like other *ad hominem* arguments it diverts attention from the details of the arguments at hand.

One aspect of Quine's methodology has been used by some of his opponents. They too have based their investigations on attempts to syntactically characterize the 'form' of I.A.E. Model theoretic or proof theoretic methods are then used to demonstrate the presence or absence of theorems of this form in quantified modal logic.[83]

My methodology goes the other way around. I develop what I take to be the intuitive notion of logical necessity *qua* logical necessity, first from a model theoretic perspective and then independently by means of a reduction to non-modal first order logic. I then *define* as benign any essentialist sentence, however invidious its 'form', that is true in this theory.[84]

I contend that in order to convince us that there is a metaphysical jungle in quantified modal logic, Quine would have to derive, from plausible premises (for example, that there are contingent truths), an essentialist statement that is incompatible with our theory of logical necessity. And since quantified modal logic, as ordinarily practiced, is compatible with our theory of logical necessity, that cannot be done.

The morals of our essentialist studies so far are these. The language of quantified modal logic can be interpreted without appeal to surrogates of any kind; thus, without appeal to essential names, whether tags or descriptions, other than variables. One fundamental theory of necessity, the theory of logical necessity, asserts no essentialism other than the benign Quinean kind. Even

taken as a characterization of the logic of metaphysical necessity, quantified modal logic is not committed to invidious essentialism, which is a question of truth not logic. Some may take the view that there is no metaphysical necessity beyond logical necessity. Others will find it justifiable, in particular cases, to accede to essentialist claims of the invidious Aristotelian kind. Quantified modal logic allows us to explore the consequences of such claims. It must be recognized, however, that insofar as we regard any invidious Aristotelian claims as true, we move beyond the theory of strictly *logical* necessity, into the realm of metaphysics proper.[85]

Part D: CONTEXTUALITY

Because of their importance in the development of Quine's thought about opacity, we must now digress to review some of his more recent views.

XX

In "Intensions Revisited", Quine recognizes that relational senses of psychological verbs suffice to interpret quantification in. This leads not to reconsideration of the tenability of quantification in but to reconsideration of the tenability of the relational senses of psychological verbs. He had already charged that essentialism is required to interpret the relational sense of necessity.[86] Now a seemingly parallel methodology leads to a seemingly parallel challenge to the relational sense of belief. This time the charge is *utter dependence cn context.* Quine now thinks necessity and belief are quite parallel with regard to their relational senses. He asserts that even the notion of essence makes sense in context. I sense here the gathering forces of a new attack on quantification into opacity.

The discussion of contextuality begins by considering certain special, and what are to be taken to be central, cases of formulations involving relational senses. Cases we can represent with quantification in as:

(12) $(\exists x) \Box (x = \alpha)$

and

(13) $(\exists x)$(Ralph knows that $x = \alpha$)

where α is a singular term. Quine lays great importance on those singular terms α which satisfy (12) and (13). He reads (12) as asserting that α expresses an 'essence'. He reads (13), following Hintikka,[87] as asserting that Ralph knows who α is. He then goes on to remark:

> The notion of knowing or believing who or what something is, is utterly dependent on context. Sometimes, when we ask who someone is, we see the face and want the name; sometimes the reverse. Sometimes we want to know his role in the

> community. Of itself, the notion is empty . . . this leaves us with no distinction between the admissible and inadmissible cases of exportation . . . Thus it virtually annuls the seemingly vital contrast . . . between believing there are spies and suspecting a specific person. At first this seems intolerable, but it grows on one. I now think the distinction is every bit as empty, apart from context, as . . . that of knowing or believing who someone is. In context it can still be important. In one case we can be of service by pointing out the suspect; in another, by naming him; in others, by giving his address or specifying his ostensible employment . . . We end up rejecting *de re* or quantified propositional attitudes generally, on a par with *de re* or quantified modal logic. Rejecting, that is, except as idioms relativized to the context or situation at hand.

There is a sub-theme, almost a presupposition, in "Intensions Revisited" (reappearing in "Worlds Away") that the availability of terms α for which (12) and (13) are true is critical to our understanding of quantification in, and in particular to our understanding of the distinction between (3) and (4). With regard to the role of (12) in modal logic, he remarks ". . . the whole quantified modal logic of necessity . . . collapses if essence is withdrawn." The suspicion that Quine is surrogate-minded grows.

Quine's new thrust against quantification in develops as follows: We begin with the sub-theme of surrogatism. Sentences of the form (13) are then seen as indicating the surrogates, and thus as crucial. Next, by reading (13) in terms of the knowing-who idiom, it is made plausible that the choice of surrogates is utterly contextual. (And thus that contextuality infects all quantification in.) And finally, contextual relativity is assumed to imply the (ambivalent) rejection of "quantified propositional attitudes generally, on a par with quantified modal logic". (More on ambivalence later.) I think each of the four steps is incorrect.

First let us clear the ground of surrogatism. It is clear that our methods do not require the use of surrogates, and indeed we used no surrogates to interpret quantified modal logic. Our classification of the logically necessary valuated \$entences was in no way reductive, in no way dependent on a prior classification of the closed sentences.[88] Second, even given the surrogate interpretation, not every name that satisfies (13) need be a proxy name. (In footnote 56 it was shown that if the attitudes are not closed under logical consequence, then contrary to Quine's claim, (13) may not play the role for the attitudes that (12) plays for modality, namely to justify treating α as an instantial term for quantification.) Third, although I have been convinced that knowing-who, in its most natural sense, is utterly dependent on context, this could not be the proper reading for (13). This takes a brief argument:

Quine acknowledges that quantified propositional attitudes do make sense relative to context. So pick a context to which to relativize. The following is a theorem of logic (no matter *how* we have relativized to context):

(y)[Ralph knows that $(y = y) \supset (\exists x)$ Ralph knows that $(x = y)$]

According to the proposed reading, logic tells us that if Ralph has noticed of a certain man in a brown hat that he is self-identical, then Ralph knows who he is. Or, to put it in the contrapositive, if Ralph doesn't know who you are, then he doesn't know anything about you. (Note that if he knows anything about you, he knows that you are self-identical.) This could not be correct. We went wrong in thinking that the benign

$(\exists x)$ Ralph knows that $(x = y)$

says, in the natural sense, that Ralph knows who y is.

XXI

I believe there is a significant use of the idioms symbolized by quantification into propositional attitudes which is not dependent on context. When Ralph saw Ortcutt in his brown hat behaving suspiciously, I think Ralph came to believe of Ortcutt that he was a spy, and this despite the fact that he didn't know, in any helpful way, who Ortcutt was. However, I will not argue that point. Instead, I will address as the main issue, the *consequences* of dependence on context, assuming it exists. Should we reject, at least for purposes of constructing a logic, a form of language in which truth is dependent on context?

I want to discuss dependence on context within a framework of critical notions which, I rush to acknowledge, I do not understand well. I aim for a useful, rough cut.

We need a better understanding of the different ways in which the 'meaning' (in a very loose sense) of a linguistic form may seem to vary from utterance to utterance and of the liabilities of each of these styles of inconstancy. For example, we are told that what counts as *knowing who* the man in the brown hat is, will vary from context to context. Does this show that the idiom ⌜knows who α is⌝ is ambiguous (like "bank"), vague (like "bald"), indexical (like "today"), a theoretical term (like "intelligent"), or what? Whatever the ultimate analysis, such variance in 'meaning' must raise the possibility of *equivocation,* the assignment of different 'meanings' to the same linguistic form within the same discourse. Let us assume that the linguistic forms with which we are concerned are *contextually determinate,* in the sense that their 'meaning' is determined by the context of their utterance. And let us suppose that the sentences in which these forms occur are otherwise sufficiently well behaved that there is a *relativized* notion of *truth with respect to a context of utterance* for them.[89]

There is an important methodological point to be made. A relativized notion of truth is no impediment to the construction of a logic. Logic aims to preserve truth. If truth varies with context, logic must preserve truth for each context. It goes without saying that premises and conclusion must be relativized to the

same context. To do otherwise would be to commit the fallacy of equivocation. Logic abhors equivocation; it does not abhor a relativized notion of truth.

I earlier mentioned Quine's "ambivalent rejection" of quantified propositional attitudes. On my reading of "Intensions Revisited", Quine accepts a relativized notion of truth for these idioms. Each denunciation of the absolute emptiness of the idioms is balanced by acknowledgment of their relativized seemliness. This is the ambivalence I saw. If this is the correct account of Quine's views, then there is no argument against a modal logic.

Quine is certainly aware of the methodological point. But he doesn't seem to come to grips with the way in which it conflicts with his idealization of eternal sentences.[90] For example, in section III of "The Scope and Language of Science"[91] he argues that deductive logic is simplified and facilitated if we rid our language of indexicals. The reason given seems to be that a sentence containing indexicals could change truth values between its appearance in a premise and its appearance in the conclusion. (Does this reflect a strangely concrete conception of the constituents of a logical argument? Is logic about tokens?) However, in the very next paragraph there is a tenative turnabout. He points out that "In practice one merely *supposes* all such points of variation fixed for the space of one's logical argument. . . ." (Why only in practice; why not in theory?) And again in *Word and Object* page 227 he clearly states, "We do apply logic to sentences whose truth values vary with time and speaker", and he warns of the fallacy of equivocation. (This time he is right on the money.)

Let us suppose that it was never the *logic* of contextually determined expressions that exercised Quine, it was always their theory of *truth* (as he says in the passage quoted at the beginning of section XIX). Here, I think he is simply too undiscriminating in rejecting the contextually determined.

The most straightforward way in which the contribution of a linguistic form may be determined by context is for the linguistic form to make explicit reference to, or other explicit use of, features of context. This is the way in which the indexicals: "I", "today", "here", etc. are contextually determinate. The indexicals are *explicitly contextual*. A pronoun whose antecedent lies within the context of the discourse, but beyond the sentence in which the pronoun occurs, is also explicitly contextual. It is not entirely trivial to develop the logic for a language containing indexicals, but it is clear that there is one.[92] The same holds for the theory of truth for such a language. I have no trouble with explicit contextuality. It is at worst benign, at best indispensable.

Is the same true of the *implicitly* contextual? In order to see how implicit contextuality affects logic, consider two cases of implicit contextuality involving ambiguity. Suppose that the ambiguity of "checks" were always completely resolved by context. (Perhaps by the discourse context, whether we are discussing haberdashery or finance; perhaps by the speaker's intentions, if that

is a legitimate part of context.) And suppose that the referential ambiguity of "President John Adams" were always completely resolved by context. (Not necessarily by the intentions of the speaker but perhaps by his connections.) Oddly enough, it is trivial to develop the logic of a language containing this kind of ambiguity. The injunction not to equivocate in the course of an argument makes the ambiguities disappear for logical purposes. Logic is unaffected by this kind of ambiguity.

Still, implicit contextuality is troubling from the point of view of truth. Implicit contextuality seems misleading in a way that explicit contextuality is not. One wants to say, mimicking Frege, "So long as there is contextual determination such variations in sense may be tolerated, although they are to be avoided in the theoretical structure of a demonstrative science and ought not to occur in a perfect language."

I think that Quine and I share discomfort with what I have called implicit contextuality, and would not like to see it appear in austere scientific language. (Though I think it is probably unavoidable.) However, Quine's conception of proper scientific language seems to lead him to want to avoid even explicit contextuality.[93]

What is the nature of the contextuality that Quine finds in the quantified propositional attitudes (and in quantified modality as well)? Let me try to formulate a *Thesis of Contextuality* I see in "Intensions Revisited":

> When we attribute a relational attitude to someone, the truth of our attribution may depend not only on the person's circumstances but on ours, in particular, on the purpose and context of the discourse in which we make the attribution.

This sounds like a thesis of implicit contextuality. And if so, and if true, it is unfortunate. (I am undecided whether it is true.[94]) But there is so much of that sort of thing going around nowadays, that it shouldn't provoke an agony of self-doubt. (Remember, even Quine was ambivalent.) As we have already seen, contextuality is no bar to our studying the notions involved with the tools of logic. I believe that with the possible exception of a few bridge laws, the logic will turn out to be the same for all contexts anyway. These studies should proceed.

Part E: Technology and Intuition

We now return to the main line of argument.

XXII

There are historical reasons that help to account for Quine's attitude toward opacity. The contexts he first investigated were quotation contexts and modal

contexts. He reports early arguments with C. I. Lewis and E. V. Huntington over the interpretation of modal logic, arguments in which "I found it necessary to harp continually on the theme of use versus mention."[95] The quotation context was seen as the paradigm of opacity. This makes the alleged theorem plausible. Quine's outlook from the early period when he began his long and fruitful studies of opacity is summed up in R&M:

> It would be tidy but unnecessary to force all referentially opaque contexts into the quotational mold; alternatively we can recognize quotation as one referentially opaque context among many.

At least since the time of "Intensions Revisited", Quine has known that *if* there is any opacity producing phrase with a legitimate relational sense, the alleged theorem is false. But he remains suspicious. His old essentialism challenge to the relational sense of necessity has been joined by a new contextuality challenge to the once secure relational senses of propositional attitude idioms.

What is the bearing of our results on Quine's doubts?

We have outlined some technological innovations (arc-quotation, valuated $entences, etc.) that promise to remove technical obstacles to quantification into arbitrary opaque contexts (arbitrary, in not requiring closure conditions).[96] The alleged theorem, which provoked the technological research, posed a *technical* objection to quantification in. So we have shown that quantification in is technically feasible.

We have done a bit more than that. We have contrasted two conceptions of the objects of intensional operators, and thus two conceptions of opacity. We have attempted to link our technology to a grand, historical, philosophical tradition, and to contrast that tradition with another grand, historical, philosophical tradition, one with which we associate Quine's doubts.[97] In this way I hoped to bring a larger philosophical perspective to bear, or, more accurately, to open the door to bringing such a perspective to bear. I know from my own case how powerful the arguments showing the inadequacies of Frege's outlook can be in dispelling a certain simple and intuitively appealing conception of opacity. Quine's doubts are not exactly Frege's. Quine is so much less theory bound, so much more 'experimental' in philosophical temperament. But his paradigm of opacity, quotation, is structurally similar to Frege's. And a paradigm may be all the difference there is between the natural and the artificial.

And we have done one thing more in a positive direction. We have argued for the intuitive reasonableness of one theory of quantified modality and the not unreasonableness of some others. But how much intuition and reasonableness can be brought to bear on a topic like modality?[98]

Beyond that we have played the traditional defense: drawing of distinctions, counter–instances, blocking moves, etc. I question the efficacy of these moves. They may defeat arguments; they rarely exorcise doubt.

What more is there to say to someone who still feels that there is something wrong with all those operators that are blithely said to be true of valuated $entences, something that is hard to put your finger on, but having to do with a promiscuous extension of the basic notional intuitions associated with the operator, the kind of promiscuous nonsense that would appear if we slipped the interpretive constraints of our direct discourse operator **Says-quote** and began regarding some quantifications in as true?

Our technology is neutral. It cannot insure against that sort of nonsense (or that sort of *falsehood*, as we earlier termed it). On the other hand, it also cannot insure against arbitrary constraints that limit all operators to a notional core; it cannot force surrender of the hard line.[99] Technology cannot insure against bad philosophical judgment. Nothing can.

What then remains to be said to instinctive hard-liners? We can try to exhibit an easy, highly intuitive case of quantification into opacity about which there are no legitimate doubts. In this way we aim to show that even beyond technology, there can be no general *philosophical* argument in favor of the hard line. With the hope that intuition will be more compelling than sophisticated technology, we also aim to nudge the intuition of the hard-liners away from the paradigm of quotation toward a new paradigm of opacity.

XXIII

Suppose Quine had begun his studies of opacity not with quotation and modality but by studying temporal operators. Consider, for example, "It will soon be the case that", which we abbreviate "**S**". Temporality involves non-purely referential occurrences of names just as surely as do necessity and belief. We may assume it true that

(14) **S**(the President of the United States is a woman)

It is also true that

(15) The President of the United States = Nancy Reagan's spouse

But it is highly unlikely that

(16) **S**(Nancy Reagan's spouse is a woman)

Thus, substitutivity fails. Contexts of **S** are opaque. Now what about quantification? Let us consider:

(17) $(\exists x)(x$ is a child . **S**(x is a woman))

Typically, Quine would ask, who is this child who will soon be a woman? Is it, as (14) suggests, the President of the United States, that is, Nancy Reagan's spouse? But to suppose this conflicts with the fact that (16) is false.

Does the apparent intelligibility of (17) therefore commit us to a jungle of temporal essentialism or utter dependence on context? Certainly not. *Being the President of the United States* need not currently characterize the individual

whom it will characterize when, according to (14), she is President, and *being a woman* is also a fugitive property. The intelligibility of (17) is quite independent of any surrogates including the singular terms of (14) and (16).

As to temporal essentialism, there are those who say that there are eternal properties (that is, properties which are temporally essential), and they might offer: *being human* (here, some Aristotelian-like essentialism), *being Nancy Reagan* (a not purely-qualitative property), or *being President of the United States in 1984* (a 'time indexed' property). There is much to say about the metaphysical views according to which *being human* is temporally essential and *being Nancy Reagan* or *being Nancy Reagan's spouse in 1984* are properties at all. I have said some of it. The important point is that such sophisticated matters, including the existence of not purely-qualitative properties, let alone their expressibility in the language of temporality, are quite irrelevant to our ability to understand (17). Indeed, if we could not already understand sentences such as (17), how could we even formulate the claims of these temporal essentialists? The intelligibility of quantification in is *prior* to the acceptance (or rejection) of essentialism, not tantamount to it.

Let me sum up the case of quantified temporal logic. Substitutivity fails, thus opacity reigns; quantification receives its standard interpretation; quantification in offers no problems of intelligibility (neither logico-semantical nor metaphysical); the interpretation of quantification in requires no surrogates, no invidious distinctions among ways of characterizing an object; the interpretation is not dependent on context; and finally, for you stubborn object fans, the objects can be characterized in inequivalent and fugitive ways. We do, of course, accord a special place to the purely referential role of variables, but we need not have any other way of specifying an object which is especially 'germane' to the question whether the object satisfies a formula containing a free variable within a temporal context. Thus we see, in a single case: counter-instances to the alleged theorem as well as to many 'philosophical' sorrows that have been thought to result from quantification into opacity.

Here is just a bit of sophisticated analysis as to what makes quantification into temporal operators work. You may think it depends on a doctrine of enduring objects. It doesn't. It depends on the doctrine that it is meaningful to ask of our objects, enduring or not, what properties *they* will or did have at other times. And we must, of course, ask this of the object itself, independent of any particular form of specification. To see this, think of the rich realm of temporal truths regarding long enduring heirlooms like Maytag washing machines and Mercedes Benzes. Now imagine that the lives of these individuals grow progressively shorter, perhaps due to a declining standard of workmanship. The temporal truths become more boring. Suppose that ultimately, like some elementary particles, they come to last for only a moment. There would then be little reason to want to discuss their future and past (they have none, in a certain sense), but it would still be meaningful to do so. There would no longer be those interesting invidious temporal *truths*, but the language and its logic would still be impeccable (though useless, as is so much that is impeccable).

There may be sophisticated disagreement about what makes quantification into opaque temporal contexts work, but it does work. And that's a fact. I cannot help but think that had Quine turned his attention in 1942 first to reference and temporality (before modality and before quotation), the recent history of semantics would have been quite different. I hope we soon learn what Quine now thinks about the bearing of temporality and opacity on the problem of quantification into opacity. How I wish we could know what Frege would say about it.

The purpose of this volume is not to praise Quine, but to query him. Still, having said so much in dispute, and so much that he will want to dispute, I wish to add what is indisputable, that tracking his thought is constantly enlightening and a continual delight.

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Appendix A: Paraphrasing into Propositional Attitudes

The tenability of the transformations which carry intensional verbs that do *not* take sentential complements—like the notional sense of "*wants* (a sloop)" and "*seeks* (the author of Waverly)"—into compounds in which the main verb *does* take a sentential (or 'propositional') complement—(like "*wishes that* one has (a sloop)" and "*strives that* one finds (the author of Waverly)"—is critical not only for Quine's analysis but also for the tradition of analyzing such constructions in accordance with Russell's theory of descriptions. Without an inner *sentential* context, Russell's distinctions of scope disappear, as do Quine's. And with them goes the thesis, so dear to Quine, of the first order eliminability of singular terms other than variables.

But it is not obvious that such transformations can always be made with preservation of meaning, not even if we take preservation of meaning to be so weak a thing as necessary equivalence.[100]

If, as Quine claims in the opening sentence of Q&PA, the incorrectness of rendering "Ctesias is hunting unicorns" in the fashion

$(\exists x)(x$ is a unicorn . Ctesias is hunting $x)$

is conveniently attested by the non-existence of unicorns, then similar consid-

erations may attest to the incorrectness of rendering "The Greeks worshiped many gods" as

(There are many x)(x is a god . the Greeks worshiped x)

or "The Greeks worshiped Zeus" as

($\exists x$)(x is-Zeus . the Greeks worshiped x)

But how shall "worships" be transformed into a propositional attitude? (The point—that such examples pose a problem for analyses by Russell's theory of descriptions—is originally due to Alonzo Church.[101] The example is from Kamp, one of four cited by Montague.[102])

And when a hunting accident so traumatizes Ctesias that he comes to fear unicorns[103] (not, to fear *that there are unicorns* or *that he will encounter a unicorn*, but to have a true unicorn phobia—one that has begun to 'generalize' to take in horses and antelopes), what propositional attitude will capture his psychological state? "What is it that you fear will happen?", we ask Ctesias. "Nothing", he replies. "I just don't like unicorns." Now it may be that even in this case there is some expression of Ctesias' fear in terms of his propositional attitudes (perhaps from a behaviorist perspective). But it would certainly be surprising if on the basis of an *a priori* linguistic analysis, it were possible to establish such a far-reaching conclusion about the grammatical form of the primitive predicates of cognitive psychology.

There is also the complication (noted in footnote 7) that hidden *relational* senses of psychological verbs may appear when *notional* senses of psychological verbs are paraphrased into the propositional attitude idiom. In some of these cases, a theory of indexicals or quasi-indexicals will not suffice. For example, the notional sense of "I seek a lion" seems to be more adequately rendered by:

I strive that ($\exists x$)(x is a lion . I find x while recognizing that x is a lion) than by Quine's formulation which omits the relational use of "recognizes" and adopts an extensional use of "find". If a lion seeker does not recognize the object he perceives close at hand (i.e., 'finds' in the extensional sense) to be a lion, he will not have satisfied his striving.[104] Here again it may be possible to find a remedy (perhaps by moving "I recognize that" to the front of the quantifier), but the matter is delicate.

There is another course. We could give up the attempt to paraphrase all the psychological opaque constructions in terms of propositional attitudes. We would lose the striking contrast between (3) and (4). We would lose the utility of elementary logic in representing internal structure for all the notional senses (for example, to represent the difference between wanting a sloop and wanting all the sloops). And, of course, the adherents of Russell's theory of descriptions would lose their confidence that their theory could solve all of the logical problems of opacity. What would we gain? First, surcease from what I believe to

be a vain attempt, and the marginal benefits that sometimes accrue from facing reality. Second, an appreciation for some of the subtlety and utility of higher order intensional logics in providing entities for "at least one sloop" and "every sloop" to mean.

Montague took exactly this course in "The Proper Treatment of Quantifiers".[105] Russell insisted, in "On Denoting", that such phrases had no meaning in isolation, but in the higher order intensional logic of *Principia Mathematica* he developed the means of providing that meaning. In Church's "Outline of a Revised Formalization of the Logic of Sense and Denotation" such meanings would be the senses of the expressions:

"$\lambda f\ (\exists x)(x$ is a sloop . $fx)$" and "$\lambda f\ (x)(x$ is a sloop $\supset fx)$".

Appendix B: The Syntactically *De Re*

In English we have negation in a pedantic *de dicto* form: "It is not the case that Ortcutt is a spy", as well as in the more colloquial *de re* form: "Ortcutt is not a spy". Corresponding to the *de dicto* modality: "It is possible that Ortcutt is a spy", we have the adverbial *de re* "Ortcutt possibly is a spy". And corresponding to the *de dicto* attitude: "Ralph believes that Ortcutt is a spy", we have the passive + infinitive *de re:* "Ortcutt is believed by Ralph to be a spy". I speak here of unproblematical matters of English syntax. I acknowledge that the semantics of these English forms is problematical. Still, the syntactically *de re* has long been used (at least since 1358) to explain the semantically *de re*. In formal systems the semantically *de re* has usually been represented by quantification into the syntactically *de dicto*. Driven by the alleged theorem, Quine introduced a formal version of the syntactically *de re* in Q&PA (where he calls it a 'relational sense'). I think it interesting and important to study these forms in their own right, their misconception notwithstanding.

Let **O** be a syntactically *de dicto* sentential operator. Then, if Γ is a formula (open or closed), $\ulcorner \mathbf{O}\Gamma \urcorner$ is a formula (open or closed, according as Γ is).[106] Quantification into the syntactically *de dicto* is permitted. ("$\Box$" is a typical syntactically *de dicto* sentential operator.) The syntactically *de re* operator also takes a formula as its operand, but rather than forming a formula it forms a compound predicate. It does this, in the manner of the λ operator, by binding variables to produce new argument places. The *degree* of the compound predicate (monadic, dyadic, etc.) is determined by the number of variables bound by the *de re* operator. If $v_1,\ldots,v_n$ are distinct variables, Γ is a formula, and $\alpha_1,\ldots,\alpha_n$ are terms, then $\boldsymbol{O}$ is the *de re* variable binding operator corresponding to **O**, $\ulcorner(\boldsymbol{O}v_1\ldots v_n)\urcorner$ is an n-place *de re* variable binding operator phrase, $\ulcorner[(\boldsymbol{O}v_1\ldots v_n)\Gamma]\urcorner$ is an n-place predicate expression, and $\ulcorner[(\boldsymbol{O}v_1\ldots v_n)\ \Gamma\ ]\ \alpha_1\ldots\alpha_n\urcorner$ is a formula. Free occurrences of $v_1,\ldots,v_n$ in Γ are